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The Effects of Group Accelerated Learning in a Computer Training Course for Lifelong Education

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Abstract

A computer training course of lifelong education was selected and the effects of Group Accelerated Learning (GAL) was investigated in comparison with that of Individual Learning (IL). As results, the author gained three major findings : (a) GAL decreased a number of questions when compared with the setting of IL, (b) GAL had the beneficial effects on detailed and careful tutoring than that of IL, because instructors could take longer time for answering in GAL regardless of same exercise time with IL, and (c) most of the easy questions and operation errors were suggested and corrected by peers in GAL.

Keywords

Lifelong Education, Computer Training, Group Accelerated Learning, Students' Questions

Introduction

Dissemination of the Lifelong Education

In 1984, the National Council on Education Reform (Kyouiku Satsin Singikai) was inaugurated as an advisory body to Minister. One of the main roles of this council was to establish systems of lifelong learning. The council called for closer ties between industry, government and the academic community in promoting lifelong education. Thereon, word 'lifelong learning' was defined as follows :

> A1 Lifelong learning covers people of all ages — from children to the elderly.
>
> (Mainichi Daily News, November 30, 1992)

Concrete possible solutions for lifelong education were proposed by the Ad Hoc Council on Education (Rinji Kyouiku Singikai) from 1984 to 1987. According to the proposal, the lifelong education enables adults to meet their learning needs by

National Institute of Multimedia Education, Japan

opening the doors of universities and graduate schools and building community schools for them (Mainichi Daily News, October 28, 1992). Successively, the Center Educational Council (Chuou Kyouiku Singikai) submitted a proposal of lifelong education to Education Minister in January 1990 (Mainichi Daily News, January 31, 1990). The council proposed that lifetime learning centers be set up at universities to provide systematic study programs for non-students. It also said lifetime education promotion centers should be established in each prefecture and special education sites should be designated. In response to this, a government advisory panel came out a new project that will feature special study programs at universities and education promotion centers in each prefecture.

Thereupon, the government drafted a "Lifelong Education Promotion Bill" which was presented to the session of the National Diet in May 1990. The main pillars of the bill are:

B1 The metropolitan and prefectural boards of education shall provide information concerning lifelong education to all residents.
B2 While activating private educational enterprises, Tokyo Metropolis and all prefectures shall formulate the basic concept for carrying out diversified lifelong education, and shall obtain the approval of the Ministry of Education and the Minister of International Trade and Industry.
B3 Lifelong education councils shall be set up in the Ministry of Education and in the prefectural government.

(Mainichi Daily News, May 15, 1990)

Continuously, the Center Educational Council submitted a proposal of reform of educational systems adapting a new epoch, and suggested the following three aims of lifelong education in April 1991:

C1 Upgrade life
C2 Update knowledge and skills in job.
C3 Use free time in meaningful pursuits.

(The Center Educational Council News, No. 5, pp. 45-53, May 1991, translated by the author)

Summarizing these movements of lifelong education, it can be described that the characteristics of lifelong education under the prefectural government are closely related to C1 and C3, in contrast with that of in Universities and Graduate schools related to C2 (Mainichi Daily News, November 30, 1992). Also, in response to these

move; B1, B2 and B3, Tokyo metropolitan government was providing lifelong education for residents using schools and education promotion sites from 1992; moreover the held courses were mainly aimed C1 and C3.

Preface of the Study

Recently, the Computer Training Courses have been preferably carried out as one of major lifelong education fields, because of the increasing speed of technological innovation which required citizens to continuously update their knowledge and skills. Nowadays, the interest of new technology is not limited to young generation, and various generations try to master the computer. Even the people aged retired life must face the innovation circumstances, and it was noted that there were even computer courses for senior citizens (Mainichi Shinbun, November 2, 1993).

In this study, a computer training course held in 1995 was selected as a subject course. This course was originally held under the sponsorship of Tokyo Metropolitan Government office as one of projects for lifelong education in 1992. The target ages and the contents were all ages and a course for computer beginners. Therefrom, courses were held four times in four years. The situations of these previous courses were described in the following section.

Previous Computer Training Courses for Residents of the Local Communities

Table 1 shows brief progress information of the courses for beginners of computer. These courses were enforced using the facilities and equipment of Sumida Technical High School.

Table 1 Computer Training Courses

Year	Training Days (Hours)	Contents of Training
1992	5(15)	Wordprocessor and Spreadsheet
1993	5(15)	Wordprocessor
	5(15)	Spreadsheet
1995	5(15)	Wordprocessor

Table 2 shows the comparison of instructional condition among courses. Every course was used 'step by step exercise way.' This way follows the sequence: lecture → exercise → lecture → exercise, by turns (Figure 1).

Prior to this study, the author interviewed the three instructors who took parts throughout all courses, and summed up their opinions. Along with this, questionnaires for impressions of participants of each year were surveyed. Following statements were the summary of courses in 1992 and 1993.

〈A course in 1992〉

The instructors selected the two application programs as contents in this course. These contents were not so difficult to learn in the case of school training. However,

a) Lecture

b) Exercise

Figure 1 Sessions in Courses.

Table 2 Instructional Condition of Courses

Year	Textbook	Printing Materials	Number of Students	Number of Instructors	Instructional Style*	Seating	Recess
1992	○	×	20	3	IL	free	×
1993	×	○	20	5	IL	free	○
1995	○	×	20	4	GAL & IL	reserved	○

IL : Individual Learning, but each participant was not prohibited to discuss freely with the others.

GAL : Group Accelerated Learning

* Instructional Style which was used in exercise sessions.

(The two courses in 1993 had held in different themes but same instructional settings.)

because of a variety of ages and difference of experiences in computer utilization of participants, their achievements were various. According to the results of questionnaires of them, there were some negative opinions against the training methods, such as 'too fast instruction speed.' Finally three students fail to perform all of the provided exercises. All the less able learner was less communication among participants as well as less experience of computer. Besides, all of less able participants were men and aged retired life. However, even the less experience person, if they had communication capabilities, it was found that they could go on with exercises with suggestive assistance from peers.

During the course, a lecturer took time for recess, but only a few did, most of the participants continued their computing.

〈Courses in 1993〉

Due to the reflection of the results of the previous year, instructors limited the contents to one application program in one course. Besides, 60 years old was the upper limit for age of participants, total number of instructors was increased from

three to five, and compelled recesses from time to time for enhancing the communication among participants. However, the most frequent troublesome occurrences were questions or comments which clearly indicate the absence of attention to the lecturer, and they did not want to ask peers. In addition, some participants requested private tutoring, against some experienced participants did what they like when in the individual exercise sessions. According to the results of the questionnaires of the participants, they described various opinions which included negative ones ; e.g. 'too fast instruction speed,' 'moderate' and 'request for further contents or exercises.' Finally, there were two less able learners who fail to perform all of the provided exercises in both courses, moreover all were men.

In both years' courses, instructors often set up the 'remedial tutorial instruction' for few participants, discovered their individual motivations and reformed their objectives. Also, some instructors must devote themselves to remedial tutorial instructions as well. In general, a computer training course in lifelong education has been held under the lecture method in a large group and sometimes personal activities such as course in 1992 and 1993 above. In the conventional instructional design fields, the individual difference in the prior capabilities is called as difference in "entering capability" (Gagne, R.M., 1975). Even a school education, it was noted that teachers were often difficult to accomplish efficiently with the differences in entering capabilities of students.

In addition to this, there were no satisfactory effects in recesses. Usually, we, Japanese men, are bad at making communication with unknown people. Hesitantly they cannot say "Please tell me," "How it work" and even "Excuse me." The problem regarding communication has come to occupy an important position in lifelong education. Therefore, a Group Learning method was decided to examine in a 1995' s course for enhancement of communication of participants.

The Arrangements of Learners into Groups

The goals of group teaching were reported in the form (Brown, G. et al., 1988) :

F1 The development of communication skills.

F2 The development of intellectual and professional competencies.

F3 The personal growth of students.

In the case of arrangement in school instruction, small groups of students are formed whose members have mastered a common set of prerequisites as the arrangement of learner into groups, and they are able to display their originality of thought in a setting which provides valuable thought from other members of the group (Gagne, R.M., 1975, op.cit.). The grouping of this way was based on the mutual development of students' competencies such as F2. However it is quite difficult to estimate the entering capabilities of participants in a lifelong education course ; moreover the ability grouping is not preferred by participants.

In spite of the differences of entering capabilities; nevertheless, it was more efficient to organize a class into several subgroups rather than a single large group (Cangelosi, J.S., 1992). Intra-class grouping arrangements in which students in each group work on a common task provide greater opportunities than whole class activities for students to interact with one another. Social psychologists also found that achievement tends to be higher in a cooperative environment (Johnson, D.W. et al., 1981). In above cases, expected effects are based on mutual assistance and relation among students such as F1 or F3. In this point of view, there was practical research report in a school. Slavin of Johns Hopkins University and his collaborators have developed a number of structured methods for fostering cooperative learning in schools (Slavin, R.E., 1986). All were based on mixed-ability groups working under two specific conditions:

D1 Students must be working toward a group goal.

D2 Success at achieving the group goal must depend on the sum of the individual achievements.

Underlining strategies in this method were as follows:

E1 Students must have a reason to take their group mates' success seriously.

E2 Group success must be based not on a single group product but on the sum of the achievements of the members.

Clearly, F2 was combined with F1 or F3 in this method.

Enhancing the communication among the participants may be not only making communication skill but also development of personal competence. It is known that Cooperative Learning (CL) is quite effective in communication making (Heinich, R. et al., 1993). In CL, above mentioned communication enhancement was developed, and fundamental methods of this are:

G1 Teammates work individually on modules.

G2 Peer tutoring among teammates as well as free discussion.

Considering the restriction of the desk arrangement in computer room, the author selected Group Accelerated Learning (GAL) that was one of the CL types, modify the method to adapt for this course, and examined in the exercise sessions in this study. Although assumptions made about GAL make it seem ideally suited for lifelong education settings, there are questions concerning the use of GAL that have yet to be answered. We also still have little precise information on how tutors prepare for small group teaching or what strategies and methods they use and what approaches are most effective for encouraging students to think and participate (Bligh, D.A., 1986). Therefore, the study reported in this article aimed to compare effects of GAL on questions of participants with conventional IL, in order to determine what instructional style best lends themselves to C1 and C3.

Methods

Figure 2 Individual Learning

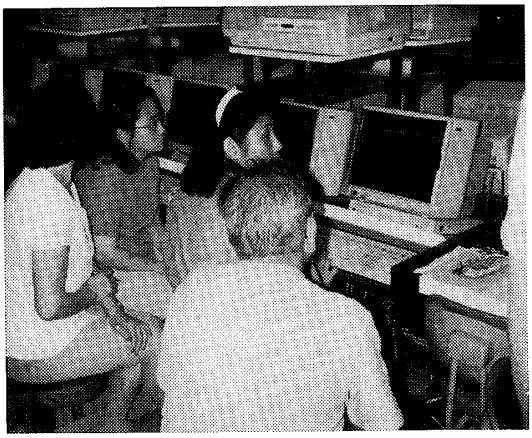

Figure 3 Group Accelerated Learning

The training course of this study was carried out in this August 14th-18th at Sumida Technical High School. The 20 subjects who were all the participants from 22 to 70 years old (average : 42.5 standard deviation : 13.0, men : 8, women : 12) were used for this study. The basic learning consisted of a set of wordprocessing method for beginners. Parallel forms of instructional styles in exercise sessions were employed : Individual Learning (IL, Figure 2) and Group Accelerated Learning (GAL, Figure 3).

The first four days were used for investigation, and each day was employed 'step by step exercise way' that noted earlier. Each instructional style was employed alternately from day to day.

Prior to the beginning of GAL, the participants were designated as four members and mixed-ages grouping randomly, and were indicated the following rules to the participants (Figure 2) by a lecturer.

Figure 2 Rules of GAL in this Study

1) Do not proceed the exercise before the instructions of a lecturer.
2) At first, each of the group members must gather around one computer, one participant (Operator) do the operation of an exercise, and the other peers (Watchers) tutor and correct his/her operation.
3) Memorandums to the textbook or notebook are available during the observation.
4) After the observation, each group member goes to own computer and operates an exercise.
5) An Operator must change at the next exercise by turns.

Appendix 1 shows the examples of exercises (Yoshida, M. ed., 1995).

Throughout the training course study, four instructors tutored the participants: one instructor did part of a lecturer and used a main computer that was set in front of the computer room and other three instructors were walking around the computer room in both instructional styles.

Each of the participants used a computer without sharing, and each computer was connected and able to be inputted keys and be controlled by the main computer through LAN-network. Thereby, a lecturer could see any display monitor and hear what any participants talked, and then surveyed to address their questions towards the instructors within main computer. During the course study, activities of instructors and participants had also been recorded by VCR.

At the conclusion of the course, the participants were given printed-based questionnaires that scores ranged from -2 to $+2$, covering C1 and C3 that were goals of lifelong education (Appendix 2).

Design and Procedure

This study employed 'time required for tutoring in each session,' 'the number of questions in each session,' 'questionnaires of participants' and 'interviews of instructors' treatments. Thereunder, survey data were assigned to the number of questions and time required for tutoring, consequently the number of questions were divided into categories. After the course, a questionnaire method for participants was done, and also instructors were interviewed.

The numbers of questions were analyzed with χ^2 analysis, and time required and questionnaires were analyzed with t-test.

Table 3 shows the number of exercises in this study.

Table 3 Number of Exercises (Instructional hours in parenthesis)

	1st day	2nd day	Total
Individual Learning	8(3)	8(3)	16(6)
Group Accelerated Learning	8(3)	8(3)	16(6)
			32(12)

Remaining three hours were used for free activities in 5th day.

Findings

Table 4 shows the proportions of time spend on exercise sessions. The result shows the instructions of four days were carried out well time shared between lectures and exercises.

Table 4 The Proportion of Time Spent on Exercises (%)

	1st day	2nd day	Total
Individual Learning	37	65	51
Group Accelerated Learning	43	60	52
			51

Table 5 shows the average time required and other calculated results for answer tutoring of instructors.

Table 5 Average Time Required for Tutoring of Instructors

	1st day	2nd day
Individual Learning	13.2 (16.2)	18.5 (34.3)
	8.1 (2.9)	13.9 (3.5)
Group Accelerated Learning	21.7 (8.2)	23.0 (7.6)
	−.52(.59)	−1.03(.43)

Seconds
Time Required (Standard Deviation)
Kurtosis (Skewness)

Instructors spend less time in IL than time in GAL. However, there was no significant result of non-relationship between time data.

Table 6 shows the number of questions from students to instructors during the exercise sessions. The author could classify the questions into four categories :

Operation : Way of key operation.
Concept : e.g. Difference of BS key and DEL key. Meaning of ESC key.
Irrelevant : e.g. A participant asked what must do. Irrelevant question.
Miscellaneous : A question based on personal interest. A question of application of utilization.

There were more questions in IL sessions than those of in GAL sessions. About half of questions were Operation questions in both instructional styles. Irrelevant question was not seen throughout the GAL sessions. Apparently, there was difference in the number of questions between instructional styles (Figure 4).

IL slightly increased in 2nd day. The result of χ^2 analysis with combined categories of Irrelevant and Miscellaneous was significantly different at alpha $<.01$ level (χ^2 value was 9.44, df=2).

The author interviewed the all instructors, and their opinions for the GAL could be encapsulated into two types below : good impressions (Figure 5), and bad impressions (Figure 6).

Table 6 Number of Questions from Students

	Operation	Concept	Irrelevant	Miscellaneous	Total
Individual Learning	31/34	16/20	6/8	8/10	61/72
Group Accelerated Learning	7/4	8/6	0/0	0/1	15/11
					76/83
					1st day/2nd day

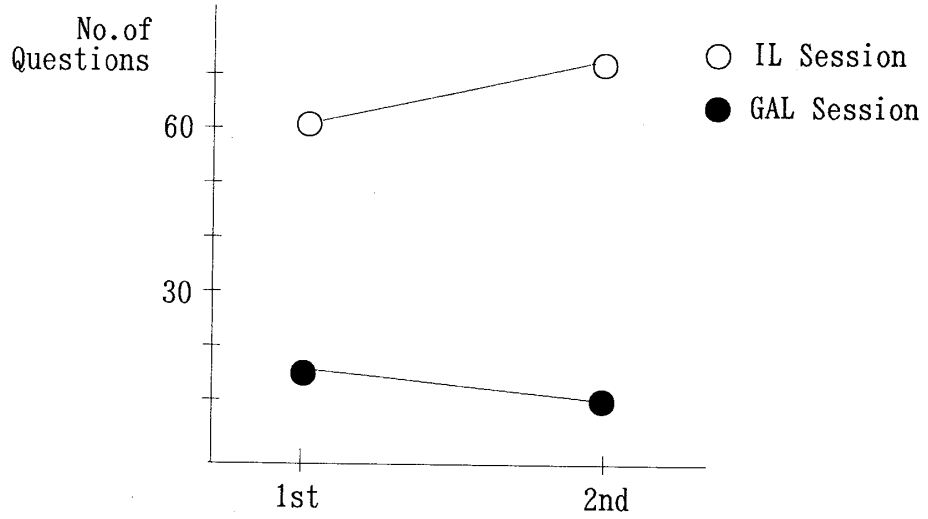

Figure 4 Total Number of Questions to Instructors

Figure 5 "What I like about Group Accelerating Learning"

1 An Operator was observed his/her operation sequence by Watchers who continuously could pay attention to textbook.
2 Watchers could make a memo of important points to their notebook or add some substantial explanations to their textbook.
3 The demonstration effects to Watchers by an Operator were expected.
4 Instructors could spend enough time to answer all questions of groups.
5 A suggestion of an instructor affected the understanding of all group members.
6 Through chances for communication, each group member could make friendship with his/her members easily.
7 Some groups made a group reader spontaneously.
8 Participants could input keys with confidence of operational sequence in personal activity.
9 Instructors could pay attention to the progress of instruction, since questions from participants were not so many.
10 Most of the easy operation errors of Operators was corrected by the group members as well as there was no fatal question that was irrelevant to the course or was due to the lack of the attention against the lecture.

Figure 6 "Difficulties and dislikes of Group Accelerating Learning"

1 The communicating skill of group members was quite important for success of this method. The instructor needed to propose some rules in this class to all participants for keep active communication.
2 'Please getting a discussion going.'
3 How to deal with the meek participants.
4 Skills of operation were dominated by the competencies of members, and sometimes unsuitable operational sequence was used in all group members.
5 Some participants tried to imitate sequence of an Operator, and their quality of thinking was low.
6 Difficult to establish the atmosphere in which an instructor answered a participant's personal question.

The Figure 7 shows the results of questionnaire treatment. Item No. 1, 2 and 3 were related to the Motivation, Change and Application effects to participants, respectively. Apparently, participants made meaning pursuits through the course.

In addition to this, correlation analysis and t-test were done for address the relation between items (Table 7). The relations Motivation-Application and Change-Application were significantly correlated with each other, but Motivation-Change was not satisfactory correlated.

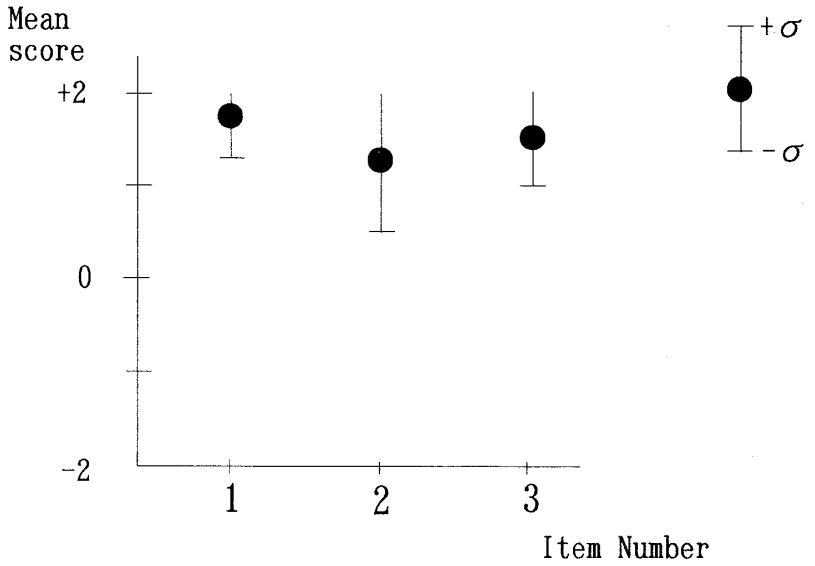

Figure 7 The Mean Scores of Questionnaire Items

Table 7 The Results of Comparison of Correlation Coefficients and t-value of Questionnaire Items

Item No.	1	2	3
1	—	.29	.57
2	1.17	—	.50
3	2.71*	2.25*	—

Lower : t-value/Upper : correlation

* : correlation significant at 5% level

Implications of the Study

There are three major findings from this study that warrant discussion : (a) GAL decreased a number of questions when compared with the setting of IL, (b) GAL had the beneficial effects on detailed and careful tutoring than that of IL, because instructors could take longer time for answering in GAL regardless of same exercise time with IL, and (c) most of the easy questions and operation errors were suggested and corrected by peers in GAL.

It might be assumed that the GAL, by virtue of its communication enhancement, would be effective method in the computer training course of lifelong education. However, this assumption was not support by this study for two principal reasons. First, instructors had the difficulties to answer personal question as well as participants were also difficult to ask under GAL atmosphere. Survey observations made during the training indicated that the participants were somewhat minded their peers. Second, skills' development of participants was sometimes dominated by the competencies of members in GAL. There were rarely seen that all of the group members operated same way that could be used but the way was not best one. On the other hand, the GAL did not make less able learners through the course, so the GAL was more direct nature seemed to keep participants more "on task."

In summary, the results of this study indicate that GAL can be highly effective instructional styles in exercise sessions of computer training of lifelong education where the additional communication capabilities provided. Although the GAL can be used effectively improve participants' communication, the GAL can have deleterious effects on optimum skill development and personal interest enhancement if it is used in a manner where some participants feel demeaned or isolated because of their additional needs.

Acknowledgment

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Appendix 1

Examples in GAL sessions

〈1st day〉

貿易記念日 (空行) (空行) 日曜第3週

の間の2行の空行を詰めます。(Delete 2 blank lines between the words.)

〈2nd day〉

以下の文章を入力します。(Input the following sentence.)

(津軽)

「あれア風ァ吹いで、ドロの樹ァジャワめでるんだネ、泣グな、泣グな、花嫁ァ泣グ奴ァあるガ、銭コねはで泣グのガ、なんだて　こした貧ボくせい結婚サねばまいねのガ。」

Examples in IL sessions.

〈1st day〉

ローマ字を用いて以下のことばを入力します。(Input the suitable alphabet letters so as to be transferred to the following 'hiragana' words.)

1）さくら　2）とまと　3）きゅうり　4）じゃがいも　5）ぶろっこりー

〈2nd day〉

移動の機能を使って、文章を以下のように変更します。(Modify the sentences to use the 'Move' function.)

社内慰安旅行会のお知らせ ○○商事　福利厚生部 幹事　墨田太郎 ↓ ○○商事　福利厚生部 社内慰安旅行会のお知らせ 幹事　墨田太郎

Appendix 2

Questionnaire Items

つぎのことについてどのように思いますか。
(Choose your impressions about the following items.)

1）ワードプロセッサの勉強をこれからも続けたいと思う。(I want to continue the learning of wordprocessor.)

大変そう思う (I thing so very much.)　　全くそう思わない (I don't thing so at all.)

＋2　　0　　－2

2）講習の前よりもワードプロセッサを使うことが簡単に思えてきた。(I feel that I can use wordprocessor easier than before the training course.)

大変そう思う (I thing so very much.)　　全くそう思わない (I don't thing so at all.)

＋2　　0　　－2

3）ワードプロセッサを日常生活か仕事で、自分から積極的に活用しようと思う。(I want to make practical use of a wordprocessor in my home or office.)

大変そう思う (I thing so very much.)　　全くそう思わない (I don't thing so at all.)

＋2　　0　　－2

生涯学習のコンピュータ訓練コースにおけるグループ促進学習の効果について

吉　田　雅　巳

概要

生涯学習プログラムの一コンピュータ訓練コースを対象として、演習時における個人学習とグループ促進学習2つの教授スタイルについての効果を比較調査した。得られた結果は以下の通りである。

(a) グループ促進学習時は個人学習時よりも、参加者の質問を減らす。

(b) 同じ演習時間でも、グループ促進学習時の方がゆっくりと時間が使えるので、指導者が質問者に対して丁寧な指導ができる。

(c) グループ促進学習では、簡単な質問や基本的な誤操作は仲間により、助言されたり訂正されたりする。

キーワード

生涯教育、コンピュータ訓練、グループ促進学習、生徒の質問

放送教育開発センター研究開発部高等教育研究室